[CASE REPORT AND LITERATURE REVIEW]

Myiasis
A Traveler's Dilemma

[a]JERE MAMMINO, DO; [b]KARAN LAL, BS
[a]Advanced Dermatology, Orlando, Florida; [b]New York College of Osteopathic Medicine, Old Westbury, New York

ABSTRACT

Myiasis is a tropical infection most often caused by *Dermatotobia hominis*, also known as the botfly. It is rarely seen in the United States. The infection has a slow evolution and often presents with painful lesions that mimic furunculosis, boils, and infected cysts. The mechanism of infection is based on the deposition of botfly eggs onto an arthropod, which acts as a vector of transmission. The arthropod infects various hosts and botfly eggs are concomitantly deposited on the host. The Dermatobia eggs transform into their larval form and penetrate the skin through adjacent adnexal structures or through the arthropod-based site of inoculation itself. Growth of the organisms within the tissues causes painful cyst-like lesions. This article describes cutaneous furuncular myiasis and discusses patterns of recognition and treatment modalities, with a case presentation of an individual diagnosed with the condition attained from a visit to Belize.
(*J Clin Aesthet Dermatol.* 2013;6(12):47–49.)

Cutaneous furuncular myiasis is a rare tropical infection caused by various arthropods including *Dermatobia hominis, Cordylobia anthropophaga, Cuterebra Wohlfahrtia* species, *Hypoderma* species, and *Cordylobia rodhain*.[1] Common sources of infection in humans are due to *Dermatobia hominis*. This infection is diagnosed mostly in tropical locations, such as Central and South America.[2] Patients suffering from this infection usually present with painful, firm, boil-like lesions that have a pore in the center of the lesion with intermittent discharge of larval waste products.[3] Because this infection is not common in the United States, it can easily be misdiagnosed for common conditions including furunculosis, sebaceous cysts, and cellulitis.[2] Due to the globalization of medicine and the increase in immigration, it is important to understand cutaneous furuncular myiasis, its clinical presentation, and the unique features that aid in its diagnosis. The authors report a case of a patient with a recent travel history to Belize.

CASE REPORT

A 31-year-old female patient presented with three slow-growing, painful sores on her scalp (Figure 1). She also presented with unilateral cervical lymphadenopathy (ipsilateral to the lesions) and swelling localized to the forehead. The lesions had been present for about a month. She had recently traveled to Belize and was cautioned prior to her trip about botfly infection-induced myiasis. The patient reported the lesions to be usually asymptomatic; however, certain triggers, such as showering reproduced a sharp piercing pain. She was very frustrated because she had called many family physicians, emergency rooms, and dermatology offices and was told no one knew how to treat her condition.

Examination revealed three mildly tender indurated nodules on the scalp. Each area had a central pore with a seropurulent discharge. Under local anesthesia, each area was incised and a larva measuring approximately 1cm was easily extracted (Figure 2).

DISCUSSION

Dermatobia hominis belongs to the order Diptera, family Oestridae, and is part of the many fly types that are responsible for cutaneous furuncular myiasis.[1] The infectious agent in myiasis was long misunderstood to be the mosquito

DISCLOSURE: The authors report no relevant conflicts of interest.
ADDRESS CORRESPONDENCE TO: Karan Lal, BS, New York College of Osteopathic Medicine, PO Box 8000 Northern Blvd, Old Westbury, NY; E-mail: klal@nyit.edu

Figure 1. Initial presentation of painful nodules on the scalp

Figure 2. Dermatobia larvae; one extracted from each of the three scalp nodules

until studies from the early 1900's confirmed that eggs located on the mosquito vectors, from the various myiasis causing diptera in the corresponding area, were behind the infection. This infective process is part of the obligate life cycle of *Dermatobia*, requiring a parasitic growth within a host.[4] The eggs, once on human skin, hatch due to the external stimuli, such as body heat, that make it possible for the larvae to flourish. The newly hatched larvae are typically 6mm in length, have a cream color, and are characterized by small fine tentacles to help them anchor within the tissue. After invading, the initial larvae grow for seven days until they require oxygen and develop a pore for oxygen exchange. Upon further development, larvae enter the secondary stage where they reach up to 15mm in length and begin to form more precise spiracles. Finally the larvae mature and enter the tertiary stage where they can group up to 2cm in length.[5] Mature larvae have multi-segmented bodies comprising circumferential spines, oral hooks, and posterior spiracles.[6] The full larval phase of development occurs over a span of 60 days, after which the larvae exits the skin to complete its development.[1]

The botfly is the most common causative agent of cutaneous furuncular myiasis; however, other Diptera, such as the tumbu fly of Africa, *Cordylobia anthropophaga*, have been identified.[2] Identifying recent travel experiences would be the key diagnostic feature as to making the correct diagnosis. Patients with a recent travel history of African countries would favor a diagnosis of tumbu fly-induced furuncular myiasis, whereas travel to central and South American countries would favor a dermatobia furuncular myiasis. Although the tumbu fly is native to Africa, cases of tumbu fly cutaneous furuncular myiasis have been reported in countries such as Saudi Arabia, Spain, and Portugal.[7–9] In addition, physicians must also inquire if patients' relatives have travelled because *Cordylobia* eggs can often be deposited on clothing where they have been found to live up to two weeks prior to invasion, and this can cause human-to-human transmission.[10]

Cutaneous furuncular myiasis caused by *D. hominis* presents as inflamed cystic nodules, all of which have a well-circumscribed central pore.[11] Lesions are commonly found on exposed areas of the skin, such as the scalp and the upper and lower limbs. The furuncular nodules often have an accompanying exudate. In addition, movement of the larvae may be visible and is a diagnostic clue leading to myiasis. Recent case reports have also found efficacy in the use of ultrasound technology in emergency situations where identification is rapidly required to differentiate between certain abscesses or infected cystic conditions.[12,13] Although a diagnostic tool, ultrasound may also help guide the physician in procuring all of the larvae. However, using this tool is usually unnecessary due to the value of the patient history and clinical presentation.

Cutaneous furuncular myiasis is a self-limited condition. The larvae mature in their final stages and exit the host to pupate. The painful nature of the lesions as well as the necrotic effect of the larvae requires their removal. A study of cases of botfly cutaneous furuncular myiasis in Belize from 1981 describes that Mayan Indians would use a fatty substance to clog the central pore, which would entice the larvae to become irritated and leave the site of inoculation.[14] A similar mode of treatment is applied with petroleum jelly or other fat-derived substances that have the capability of preventing oxygen from reaching the larvae.[4] Surgical resection of larvae, with local anesthetics, is the gold standard form of treatment; however, it must be done with precision so as to remove the whole organism and not just the superficial body parts for that can cause superinfection in which case antibiotics will be required along with further debridement.[15] It is often recommended that an excisional biopsy technique be employed, which assures that the larvae, along with the subcutaneous tissue surrounding the

implanted larvae, are removed.[16] In the case of the patient described herein, the larvae were easily extracted through simple incisions and the lesions were cleaned of excretory debris.

CONCLUSION

As more people travel abroad, there is an increased exposure to microbiological organisms indigenous to various areas. Because of this, understanding regional and global aspects of medicine is essential in formulating the correct diagnosis and prognosis. Physician education is required as well, as evident with the patient in this case who had reported her symptoms to many dermatologists and emergency room physicians who were unaware of the lesions and causative agent. *Dermatobia hominis* are common flies in areas of Central and South America. Being aware of the larvae and the signs and treatment of the cutaneous furuncular myiasis can greatly aid a healthcare professional.

REFERENCES

1. Rook A, Burns T. *Rook's Textbook of Dermatology*. Chichester, West Sussex, UK: Wiley-Blackwell; 2010.
2. Jacobs B, Brown DL. Cutaneous furuncular myiasis: human infestation by the botfly. *Can J Plast Surg.* 2006;14(1):31–32.
3. Ofordeme KG, Papa L, Brennan DF. Botfly myiasis: a case report. *Can J Emerg Med.* 2007;9(5):380–382.
4. Kahn D. Myiasis secondary to Dermatobia hominis (human botfly) presenting as a long-standing breast mass. *Arch Pathol Lab Med.* 1999;123:829–831.
5. Hogue CL. *Latin American Insects and Entomology.* Berkeley: University of California; 1993.
6. John DT. Features of a dermatobia hominis third stage larva. *Proc Okla Acad Sci.* 2006;86:85–86.
7. Laurence BR, Herman FG. Tumbu fly (*Cordylobia*) infection outside Africa. *Trans R Soc Trop Med Hyg.* 1973;67:888.
8. Curtis SJ, Edwards C, Athulathmuda C, et al. Case of the month: cutaneous myiasis in a returning traveler from the Algarve: first report of tumbu maggots, *Cordylobia anthropophaga*, acquired in Portugal. *Emerg Med J.* 2006;23:236–237.
9. Omar MS, Abdalla RE. Cutaneous myiasis caused by tumbu fly larvae, Cordylobia anthropophaga in southwestern Saudi Arabia. *Trop Med Parasitol.* 1992;43:128–129.
10. Van Hal SJM, Hudson BJ, Wong DA. Furuncular myiasis after contact with clothing (when washing clothes can be infectious). *Clin Infect Dis.* 2004;39:1552–1553.
11. Cestari T, Pessato S, Ramosesilva M. Tungiasis and myiasis. *Clin Dermatol.* 2007;25(2):158–164.
12. Quintanilla-Cedillo MR, Leon-Urena H, Contreras-Ruiz J, et al. The value of Doppler ultrasound in diagnosis in 25 cases of furunculoid myiasis. *Int J Dermatol.* 2005;44:34–37.
13. Hohenstein EJ, Buechner SA. Cutaneous myiasis due to Dermatobia hominis. *Dermatology.* 2004;208:268–270.
14. Keech, Capt JP. *Dermatobia hominis*—in Belize. *J R Army Med Corps.* 1981;127:131–133.
15. Harrell WB, Mosely V. The surgical treatment of subdermal myiasis due to *Dermatobia hominis. South Med J.* 1942;35:720–723.
16. Sampson CE, MaGuire J, Eriksson E. Botfly myiasis: case report and brief review. *Ann Plast Surg.* 2001;46:150–152.